

Artificial Sweeteners

Data from epidemiologic studies do not provide clear evidence of an association between artificial sweeteners and human cancer, nor do they conclusively rule out such a possibility. Interest in whether such an association exists developed when early studies showed that cyclamate, one of several types of artificial sweeteners, caused bladder cancer in laboratory animals.

This finding in animals suggested that cyclamate may increase the risk of bladder cancer in humans; for this reason, the U.S. Food and Drug Administration (FDA) banned the use of cyclamate in 1969. However, results of animal studies conducted in more recent years have failed to demonstrate that cyclamate is a carcinogen (a substance that is known to cause cancer). Nevertheless, other issues must be resolved before cyclamate can be approved for commercial use in restricted amounts. These issues include determining whether cyclamate is a co-carcinogen (a substance that enhances the effect of a cancer-causing substance) and ascertaining the potential risk for specific groups within the population, such as those who would consume large amounts of cyclamate.

Other animal studies, including one conducted in Canada several years ago, have linked saccharin, another artificial sweetener, with the development of bladder cancer. The FDA consequently proposed a ban on saccharin in April 1977. However, the Saccharin Study and

Labeling Act, passed by Congress in November 1977, placed an 18-month moratorium on any action against saccharin by FDA and required that all food containing saccharin bear the following warning label: "Use of this product may be hazardous to your health. This product contains saccharin, which has been determined to cause cancer in laboratory animals." The moratorium has been extended to May 1997.

During 1978 and 1979, the National Cancer Institute (NCI) and FDA conducted a population-based study on the possible role of saccharin in causing bladder cancer in humans. In general, people in the study who used an artificial sweetener had no greater risk of bladder cancer than people in the population as a whole. However, when only the data for heavy users were examined, there was some suggestive evidence of an increased risk, particularly in persons who consumed both diet drinks and sugar substitutes and who used at least one of these two forms heavily. In the study, which included a large number of elderly people, heavy use was defined as six or more servings of sugar substitute or two or more 8-ounce servings of diet drink daily.

The results of the NCI-FDA study, together with findings of additional research with laboratory animals, suggest that consumption of saccharin is not a strong risk factor for bladder cancer in humans. More recent animal studies also suggest that saccharin is unlikely to be a risk factor for cancer in humans.

Aspartame, a third type of artificial sweetener, was approved in 1981 by the FDA after tests showed that it did not cause cancer in laboratory animals, although not all the laboratory experiments agreed. At present, aspartame is a common artificial sweetener and is distributed under the trade name of Nutrasweet or Equal. Interest in aspartame was renewed by a 1996 publication which suggests that an increase in the number of persons with brain tumors between 1975 and 1992 may be associated with the introduction and use of this sweetener in the United

States. However, a recent analysis of NCI statistics on cancer incidence in the United States does not support an association between the use of aspartame and an increased incidence of brain tumors. These data show that the overall incidence of brain and central nervous system cancers began to rise in 1973, 8 years before the approval of aspartame, and continued to rise until 1985. Increases in overall brain cancer incidence have occurred primarily in the 70 and older age group, a group that has not been exposed to the highest doses of aspartame since its 1981 introduction. Since 1985, the incidence of these cancers has stabilized, and, in the last 2 years for which data are available (1991 to 1993), the incidence has, in fact, decreased slightly. Thus, at this time, there is no clear link, based on animal or human studies, between the use of aspartame and the development of brain tumors.

References:

Cohen, SM: Cell proliferation in the bladder and implications for cancer risk assessment. *Toxicology*, 102(1-2): 149-159, 1995

Food and Drug Administration: *FDA Statement on Aspartame*, November 18, 1996

Department of Health, Education, and Welfare: *FDA and NCI Announce Plans to Conduct a Nationwide Study on the Possible Role of Saccharin in Causing Bladder Cancer in Humans*, January 25, 1978 (press release).

Olney, John: Increasing brain tumor rates: Is there a link to Aspartame? *Journal of Neuropathology and Experimental Neurology*, 55: 1115–1123, 1996.

Thorgeirsson, UP, et al: Tumor incidence in a chemical carcinogenesis study of nonhuman primates. *Regul Toxicol Pharmacol*, 19(2):130–151, 1994

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Sources of National Cancer Institute Information

Cancer Information Service

Toll-free: 1-800-4-CANCER (1-800-422-6237)

TTY (for deaf and hard of hearing callers): 1-800-332-8615

NCI Online

Internet

Use <http://www.cancer.gov> to reach NCI's Web site.

CancerMail Service

To obtain a contents list, send e-mail to cancermail@icicc.nci.nih.gov with the word "help" in the body of the message.

CancerFax® fax on demand service

Dial 301-402-5874 and listen to recorded instructions.

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